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UNITED STATES DISTRICT COURT

CENTRAL DISTRICT OF CALIFORNIA

ENTROPIC COMMUNICATIONS, LLC,

Plaintiff,

v.

DISH NETWORK CORPORATION, *et al.*,

Defendants.

Case No. 2:23-cv-1043-JWH-KES

PLAINTIFF'S SUPPLEMENTAL BRIEF IN SUPPORT OF ITS OPPOSITION TO DEFENDANTS' MOTION TO DISMISS

Date:	July 21, 2023
Time:	11:00 AM
Courtroom:	9D

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I. The '566 Patent

A. Summary of the Intrinsic Record of the '566 Patent

Briefly, the claims of the '566 Patent relate to a communication circuit including a controller. The controller is placed in charge of establishing and maintaining a new local area network (LAN) on top of a pre-existing coaxial cable network or "CCN." *See* '566 Patent at 4:11-19. The controller performs various steps, including handling an admission request from a new node. After admission, the controller adapts communication with the new node based on probing of the link established with that node, as described below.

To place the claims in proper context, the full intrinsic record must be considered. The specification of the '566 Patent comprises more than 24 columns of description and 19 figures. The prosecution history of the '566 Patent, including the three parent patents of the family, spans 14 years of prosecution and 13 office actions resulting in claim amendments and/or substantive arguments by the applicant. The claims that emerge claim a new network architecture designed to use the physical elements of a pre-existing coaxial cable network, includes a multitude of cabling, splitters and other elements. *See, e.g.*, *id.* at 1:41-46; Fig. 1; Fig. 2. The new network co-exists with the predetermined connectivity of the pre-existing CCN. '566 Patent at 10:64-66. Thus a new web of connectivity between nodes is established over the existing topology. The new network based on the '566 Patent's described architecture is referred to as a Broadband Coaxial Cable Network or "BCN." *See, e.g.*, *id.* at 4:23-42. MoCA networks are an example of a BCN.

Because the nodes of the BCN network are themselves physically connected into the CCN's wiring, splitters, etc., these nodes have a dual existence—they are members of both the (old) CCN and the new network itself. This is indeed the entire point of the invention—to establish a new LAN while re-using the pre-existing coaxial cable elements to transport data. Because these nodes are equipped with new BCN modems for communicating with other BCN modems, such nodes are able to

form their own network that co-exists alongside (and on top of) all the pre-existing infrastructure. The new layer provides new two-way network communication between any of the nodes. *See, e.g.*, *id.* at 6:29-33, 6:38-42.

One of the crucial features of the protocol for the new network provides that the new BCN-capable devices are not admitted to the network merely by virtue of being physically connected to a cable. While that worked for simple arrangements like the CCN, the new network architecture requires more. An admission procedure must be followed in which a given one of the newly-capable devices is assigned as a controller. That node is placed in charge of admitting new nodes, as described in detail in the specification. *See, e.g.*, *id.* at 7:33-8:14 and 11:59-12:21. This admission procedure that occurs at the communication link level (as opposed to a mere physical connection to the coaxial cable) is the subject matter of the '566 Patent.

B. Details of the Intrinsic Record of the '566 Patent

Independent claims 1 and 11 relate to admission of new nodes that are physically connected to the CCN, but are not yet admitted to the BCN. For example, claim 11 reads:

> A communication circuit comprising:
>
> a controller that is operable to, at least:
>
> transmit first information on the CCN, the first information comprising information indicating when admission messages for requesting admission to the CCN may be transmitted on the CCN;
>
> receive an admission request message from a new node for admission to the CCN;
>
> if the received admission request message is correctly received and the new node is authorized to join the CCN, then perform an admission procedure with the new node;
>
> *probe a communication link of the CCN connecting the communication circuit to the new node*; and

adapt transmission parameters *for the communication link* based, at least in part, on the probe.

See id., claim 11 (emphasis added).

The claimed "communication link" is not any generic link, but instead is the specific linkage of the CCN that transports signals from the claimed controller to the new node. As the claim expressly requires, the controller must probe "the communication link of the CCN" connecting the communication circuit to the new node, and the transmission parameters are adapted for that "communication link."

In the prior art, devices such as set-top boxes ("STBs") for television services were physically connected to coaxial cable to receive incoming cable/satellite television signals. *Id.* at 1:66-2:1. The STBs connected in that fashion converted and output received television signals, typically to an RF signal for transmission to a television receiver. *Id.* at 2:2-4. A prior art cable system implementing this downstream-only communication is depicted in Figure 2 of the '566 Patent, showing a signal received at a point of entry (POE), and then being transmitted to various STBs connected to the coaxial cable. *Id.* at 2:19-21; Fig. 2. *See also* U.S. Patent Appl. Ser. No. 11/231,349, Amendment (July 2, 2009), Exhibit A[1] to the Declaration of George Summerfield at 11 (in prior art "*coaxial cable networks*, components typically communicate through a stable environment in which the signal that arrives in a home network from a service provider is routed through splitters to each of the components in the coaxial cable network that reside in the home" ((emphasis in original)).[2]

Eventually, new classes of customer premises equipment ("CPE") were developed that provided a potential for nodes to communicate with each other. But potential is far from reality—how could the physical links between devices in different rooms of a home or similar premises be established? Communication

[1] This Amendment is from the ultimate parent of the '566 Patent.
[2] All citations to exhibits are to the exhibits attached to the Declaration of George Summerfield concurrently filed herewith.

requires a connection capable of transporting the data between the nodes. '566 Patent at 3:1-20. The specification describes "numerous consumer electronics appliances and software applications [that had] been developed . . . that are able to receive, store, process and transmit programming information to multiple devices in the home at the time and manner as determined by the viewer," but, at the same time, there was lacking "a viable home networking solution" for such devices. *Id.* at 3:1-10. Such a solution would indeed enable these different CPEs "to communicate between themselves in a network type of environment within the building." *Id.* at 3:11-17.

The '566 Patent (as well as its parent patents) provided such a solution by reusing the existing physical communication links—part of the existing CCN—to establish a peer-to-peer network as depicted in simplified form in Figure 8 of the '566 Patent:

Id. at 16:56-57 (red annotations added).

Figure 8 depicts the logical communication links among nodes in the new network, but, underneath those links, the coaxial cable physical connections remain the same. *Compare, e.g.*, *id.,* Fig. 7 and 15:13-38 (physical level) with Fig. 8 and

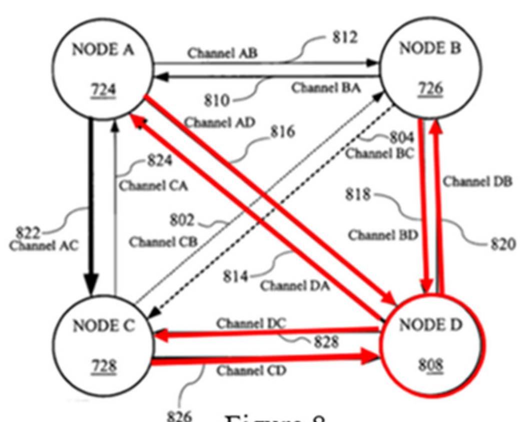


Figure 8

15:39-16:29 (logical level - illustrating common nodes 724, 726 and 728).

The invention uses the claimed controller to create, manage, and optimize communications within the claimed CCN via a unique communication circuit having logical communication links over pre-existing coaxial cable, thereby allowing the

nodes connected via those links to communicate with each other. *Id*. at 3:21-24; 4:22-42. The first BCN modem that enters the network is (usually) designated as the "controller." *Id*. at 7:34-43. The controller then facilitates the formation of a peer-to-peer, logical mesh network over the existing coaxial cable by performing an admission process for other nodes seeking to join the CCN. *Id*. at 7:44-60. Once a node is admitted to the CCN, the controller optimizes communication over the "communication links" (as opposed to the coaxial cable, *per se*) between the newly admitted node and the already-admitted nodes on the CCN. *Id*. at 7:61- 8: 5. The network controller performs this optimization through the use of a probe packet to probe those communication links. *Id.* at 8:37-44.

The prosecution of the ultimate parent to the '566 Patent made clear that, unlike in the prior art, a network controller provides the necessary information allowing other BCN modems to "adapt to the network characteristics, synchronize to the network timing and framing, make transmission requests and be able to communicate with some or all of the other BCM modems in the network." U.S. Patent Appl. Ser. No. 11/231,349, Amendment (March 20, 2012) [Ex. B] at 8-9. And, "[o]ne of the steps of a network admission process is 'the optimization of the transmission characteristics between the BCN modem, and any of the other BCN modems already in the network.'" U.S. Patent Appl. Ser. No. 11/231,349, Amendment and Reply (Oct. 18, 2012) [Ex. C] at 11.

Turning again to Figure 8, one of the four nodes in that example, *e.g.,* Node A, is the first BCN modem to join the network, and acts as the controller, thereby performing the admission process for the other nodes. '566 Patent at 12:6-8. The result of that admission process is that each Node A-D in the resulting mesh network is logically connected to, and can communicate with, the other nodes through multiple communication links, as exemplified with regard to Node D, highlighted in red, above. *See id.* at 15:62-16:5. This, again, is in contrast to prior art coaxial cable networks only capable of communication in one direction over the physical coaxial

cable, with no peer-to-peer communication capability over logical communication links. *See id*. at 2:52-67.

Further, in contrast to the invention claimed in the '566 Patent, no network controller was needed in prior art coaxial cable networks at all. '566 Patent at 3:39-46. *See also* ECF Dkt. 1, ¶ 24. Relatedly, there had been "a long felt, but unresolved need for a broadband system that allows components to communicate without the need for an active device in the network to overcome the isolation of the splitters used in the coaxial cable wiring of a typical home." U.S. Patent Appl. Ser. No. 11/231,349, Amendment (July 2, 2009) [Ex. A] at 11. That long-felt need was met by a communication circuit controller in communication with a CCN used for the admission or, and optimization of logical communication links between, new nodes on the CCN, resulting in a peer-to-peer logical mesh over pre-existing coaxial cable—something that had been previously thought to be impossible. Dkt. 1, ¶ 26.

Finally, original claim 1 in the ultimate parent to the '566 Patent specified, *inter alia*, "[a] Broadband Coaxial Cable Network ("BCN") comprising: a first BCN modem in signal communication with a coaxial cable network." *See* U.S. Appl. Ser. No. 11/231,349 [Ex. D]. The common thread from that original claim to the '566 Patent claims is the BCN controller performing functions that did not exist with pre-existing cable lacking a BCN.

C. Claim Construction

This Court has summarized the law regarding the claim construction task, in relevant part, as follows:

> Claim terms 'are generally given their ordinary and customary meaning,' which is 'the meaning that the term would have to a person of ordinary skill in the art.' The terms must be read in the context of the entire patent, however. In interpreting a claim, the Court must focus primarily on the intrinsic evidence of record, including the claims themselves, the specification, and, if in evidence, the prosecution history.

> Among the intrinsic evidence, the 'specification is always highly relevant to the claim construction analysis. Usually, it is dispositive; it is the single best guide to the meaning of a disputed term.' 'The specification is, thus, the primary basis for construing the claims.' It is 'entirely appropriate for a court, when conducting claim construction, to rely heavily on the written description for guidance as to the meaning of the claims.'

Wonderland Nurserygoods Co., Ltd. v. Baby Trend, Inc., 5:14-cv-01153, 2020 WL 13680678 at *3 (C.D. Cal. Dec. 30, 2020) (Holcomb, J.) (internal citations omitted).

On a related note, in the context of a Rule 12(b)(6) patent eligibility challenge under section 101, a court should consult the specification, which it "must accept as true at the pleadings stage." *Weisner v. Google LLC*, 51 F.4th 1073, 1088 (2022).

Turning to the construction of the claim elements identified by the Court, contextually, each of these elements are carried out by the controller responsible for admitting, and communicating with, new nodes to network. Entropic proposes the following constructions for the emphasized terms, shown with the surrounding claim language:

Element	**Proposed Construction**
if the received admission request message is correctly received and the new node is authorized to join the CCN, <u>**perform an admission procedure**</u> with the new node	Establishing a logical communication link between the controller node and the new node over existing CCN physical connections.
<u>**probe a communication link**</u> of the CCN connecting the communication circuit to the new node	Evaluating characteristics of the signal pathway from controller node to the newly admitted node, using one or more probes.

Element	Proposed Construction
<u>adapt transmission parameters</u> for the communications link based, at least in part, on the probe.	Selecting transmission parameters for the signal pathway from controller node to the newly admitted node, based in part on the evaluation of the prior probing step.

D. The Impact of Claim Construction on Patent Eligibility

As noted in *Virtual Immersion Technologies LLC v. Safran S.A.*, cited by the Court in ordering supplemental briefing, a factual issue relevant to addressing *Alice* step one is "[w]hether something is well understood, routine, and conventional to a skilled artisan at the time of the patent." *Virtual Immersion Technologies LLC v. Safran S.A.*, 22-cv-1248, Order (C.D. Cal. June 5, 2023) ("*Virtual Immersion Technologies*") at 7, *quoting Berkheimer v. HP Inc.*, 881 F.3d 1360, 1368 (Fed. Cir. 2018).

Here, the claimed steps are performed by the claimed controller connected by a communication link of the CCN to a new node that seeks admission to the peer-to-peer communication network. That peer-to-peer network is established on the pre-existing physical linkages (cables, splitters, etc.) of the CCN—something previously believed to be impossible. Dkt. 1, ¶ 26. DISH has sought to reduce the claims to what it characterizes as the abstract idea of "authentication and admission of authorized devices into a network." *See* Dkt. 50-1 at 14. But the claims are not generic to any admission process. They are specific insofar as they are directed to establishing a new connection in a new peer-to-peer network that exists alongside, and overlaid on top, of a pre-existing CCN, including the latter's physical elements.

As noted above, in pre-existing coaxial cable networks, the physical elements thereof were hamstrung with limitations allowing for only one-way, top-down communication. *See, e.g.*, '566 Patent, Figs. 1-2. Such communication could not

accommodate a peer-to-peer network connection to a new node solely by means of a physical connection. The '566 Patent claims specific procedures to add a new node to the peer-to-peer network over logical communication links. A new node is admitted to the CCN only under control of the controller, which then probes and adapts the communication link(s) connecting that newly-admitted node to the CCN. In this way, each link between pairs of nodes can be separately adapted to account for differing qualities of the physical components in the pre-existing coaxial cable network, thereby ensuring the ability to support higher frequency ranges. *See* '566 Patent at 1:53-65.

Of note, prior art coaxial cable networks did not use controllers at all, let alone for purposes of admitting new nodes, or probing and adapting peer-to-peer communications between a new node and existing nodes on the network, as no such communications were possible over the physical coaxial cable in such networks. *See* § II(A)(1), *supra.* Thus, the use of a controller in the manner claimed in the '566 Patent, including the claimed node admission procedure steps at issue, was not well understood, routine, or conventional.

As also discussed above, a node physically connected to coaxial cable had only one communication path over the physical cable available to it. *See* § II(A)(1), *supra.* Such networks, therefore, had no need for the claimed optimization, as there was no need to adapt transmission parameters for communication links between a multiplicity of peer nodes. *See id.* Thus, the claimed optimization was not well understood, routine, or conventional in prior art coaxial cable networks, nor, obviously, were probes used for such optimization. The claims of the '566 Patent are therefore not directed to an abstract idea.

Assuming the Court reaches *Alice* step 2, it has recognized that inventions improving upon a physical instrumentality, *e.g.,* computers, pass muster under that step. *Virtual Immersion Technologies* at 8 (citations omitted). Here, as is evident from the specification, which must be taken as true at this point, the claimed

controller chooses separately which nodes to admit to the CCN, and which to reject. The controller individually probes, and adapts parameters for, each link with each new node, thereby enabling improved/optimal use of the physical links (cables, splitters, etc.). The varying topology of each peer-to-peer link means that each link may have quite different quality associated therewith. *See* '566 Patent at 1:53-65. For example, some links may use different quality cables, or some links may have more splitters along the route. *See id.* By individually addressing and adapting each communication link, the invention improves upon the pre-existing state of the art (which, in fact, was so poor that no peer-to-peer network over preexisting CCN architectures existed at all).

Finally, Entropic notes the above discussion does not address the remaining limitations of the challenged claims. However, these steps, too, are far from generic, as they all pertain to the functions of a controller that were simply inapplicable to pre-existing cable networks.

II. The '910 Patent

A. The Intrinsic Evidence of the '910 Patent

As discussed herein, the invention of the '910 Patent is directed to aggregating individual packet data units (PDUs) based upon the destination for such PDUs specified in the aggregation identifications (IDs) of the PDUs. In claim 3, the packet aggregation module, which is one component of the claimed system, forms an aggregate packet using aggregation identifiers (IDs) of the packet data units:

> A system for transmitting digital data over a network comprising:
>
> a transceiver adapted to receive a plurality of packet data units; and
>
> a packet aggregation module for identifying at least two of the plurality of packet data units that have a same destination node and for forming an aggregate packet from the at least two of the plurality of packet data units;

wherein the transceiver is adapted to transmit the aggregate packet to at least one destination node; and

wherein the packet aggregation module identifies the same destination node by identifying a same aggregation identifier.

As detailed in the specification, a communication network transmits digital data in the form of packets. '910 Patent at 1:30-33. These packets, or packet data units ("PDUs"), have overhead information, which "includ[es] identifiers, source and *destination addresses*, [and] error control fields," allowing a PDU to reach its destination. *Id.* at 1:33-35 (emphasis added). PDUs also contain "payload" information. *See id.* at 3:49-52. In this way, a PDU is like a physical letter, wherein the information on the envelope (address, return address, postage) is akin to the overhead data, and the contents of the letter corresponds to the payload.

While overhead information allows a PDU to reach correct destinations, it "reduces the availability of network bandwidth for user data." *Id.* at 1:33-37. To solve the challenge, the invention of the '910 Patent aggregates individual PDUs transmitted to the same destination node such that overhead data need be transmitted only once. This is analogous to putting two letters destined for the same address in the same envelope.

Specifically, the '910 Patent teaches a system comprising, *inter alia*, a transceiver and a packet aggregation module. *See id.* at 3:9-41; Fig. 2. Once the transceiver receives multiple PDUs, the packet aggregation module identifies at least two PDUs that have the same aggregation ID, including a common destination. *Id.* at 4:6-12. In one example, the transceiver receives several Ethernet packets (PDUs) that are converted to Multimedia over Coax Alliance ("MoCA") packets. *Id.* at 3:42-47. The packet aggregation module then classifies (sorts) the MoCA packets according to their respective aggregation IDs, including destination. *Id.* at 5:46-56. *See also id.*, claim 3 (the packet aggregation module sorts PDUs having the same destination through their respective aggregation IDs).

Next, the packet aggregation module aggregates the sorted PDUs to form a single aggregate packet for transmission. *Id.* at 3:42-47; 3:57-59. In this way, a single set of overhead data is transmitted for an aggregated packet, rather than having such information separately transmitted multiple times for each individual, unaggregated packet – multiple letters in a single envelope, rather than an envelope for each letter. *See id.* at 1:30-37; 1:66-col. 2:3. *See also id.,* Figs. 3, 4.

The claimed aggregation implicates the challenge in navigating the interface between two networking protocols—in this case, Ethernet and MoCA, the latter being a MAC/PHY specification, *i.e.,* operating on transmission layers 1 and 2, as opposed to Ethernet, which operates on higher layers. *See id.* at 1:22-23. The patent mandates that Ethernet packets received by a network node operating in accordance with MoCA "must" be converted to MoCA packets before being transmitted to other nodes of the network. *Id.* at 3:42-47. The need for this conversion is illustrated in Figure 3, which shows an Ethernet packet having an Ethernet Header being converted to a MoCA packet containing its own control information - "a preamble 45, a MoCA MAC header 46, which provides the destination address of the packet, and a MoCA Media Access Control ('MAC') CRC 44." *Id.* at 3:55-60.

That the packet aggregation module and its claimed functionality was inventive is confirmed by the Examiner in the prosecution history for the '910 Patent, identifying the following as the inventive subject matter:

> [A] packet aggregation module for identifying at least two of the plurality of packet data units that have a same destination node and for forming an aggregate packet from at least two of the plurality of packet data units . . . wherein the packet aggregation module identifies the same destination node by identifying a same aggregation identifier.

U.S. Appl. Ser. No. 12/117,890, Notice of Allowability (April 4, 2012) ("Notice of Allowability") [Ex. E] at 2.

B. Claim Construction

The Court ordered Plaintiff to provide constructions for the terms “packet aggregation module” and “forming an aggregate packet” in the ’910 Patent. ECF Dkt. 66. With the evidence intrinsic to the ‘910 Patent providing context, the following are Entropic’s proposed constructions for the two terms identified by the Court:

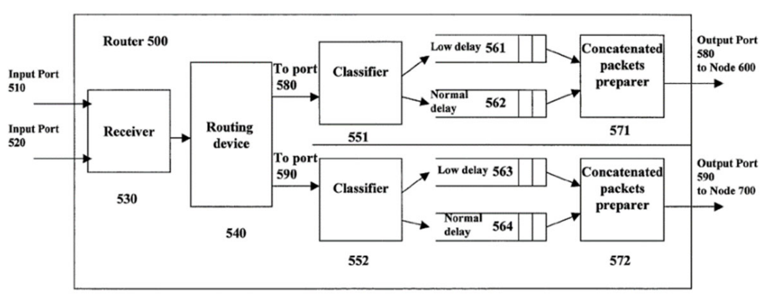
Limitation	Proposed Construction
a packet aggregation module for identifying at least two of the plurality of packed data units that have a same destination node	A module that forms aggregate packets from individual packet data units based upon those individual packet data units having the final destination, indicated by having the same aggregation identifier.
and **forming an aggregate packet** from the at least two of the plurality of packet data units;	Combining a plurality of packet data units having the same aggregation identifier identifying the same final destination node, wherein the aggregated packet comprises a single header, and an aggregated payload that is formed from the plurality of packet data units.

C. The Impact Of Claim Construction On Patent Eligibility

As stated above, a factual issue relevant to addressing *Alice* step one is “[w]hether something is well understood, routine, and conventional to a skilled artisan at the time of the patent.” *Virtual Immersion Technologies* at 7. When properly construed, the recited “packet aggregation module” and its associated functionality convey the innovative features claimed by the ‘910 Patent, as confirmed during the prosecution of that patent.

Ethernet does not understand the topology of the MoCA nodes, nor the logical connections handled by MoCA. MoCA is a MAC/PHY protocol—it handles the functions of the lowest two layers of communication in the OSI protocol. Ethernet need not—and does not—know the details. For example, it does not understand that MoCA nominates a Network Coordinator (NC) node to administer the network. *Id.* at 1:23-29; 2:24-26. Ethernet does not understand MoCA topology, *i.e.,* the various logical and physical links set up by the NC to deliver data. *Id.* at 2:42-63. Accordingly, Ethernet (and like prior art) is in no position to aggregate PDUs based upon a common destination. Prior art systems did concatenate packets based on other criteria. For example, prior art cited during prosecution of the '910 Patent, U.S. Patent No. 7,170,893 to Rajan et al. ("*Rajan*"),[3] relied upon "delay and throughput requirements," as opposed to destination information, to concatenate (aggregate) packets. *See, e.g., Rajan* [Ex. F] at 2:21-23; 5:31-36.

Rajan teaches a "a receiver for receiving packets and a routing device for routing the received packets to one of the two output ports," each output port with "a traffic characteristic classifier for classifying a received packet based on its traffic characteristic." *Id.* at 1:46-50. *Rajan's* routing device concatenates data packets with common traffic characteristics (as opposed to destination node information) before transmitting the data to destination nodes, which are only determined at the transmitting nodes output port, as shown in *Rajan's* Figure 5:



See id. at 4:65-col. 5:26.

[3] The application underlying *Rajan* was the actual reference cited during prosecution.

In *Rajan,* "the destination addresses of packets 1-1 are extracted from respective headers and then are stored, for example, in a memory (not shown)." *Id.* at 2:56-58. These are not discarded—they remain essential, precisely because the final packet destinations may be different. Those destinations are sent along with the concatenated packet inside the payload so that, when the concatenated group is pulled apart at some downstream router, the destination of each constituent packet can be recovered and used to send the packets to their respective destinations. *Id.* at 3:16-19. This scheme is sensible for the architecture of *Rajan*—routers, performing IPv4 routing (the IP part of TCP/IP internet protocols, sitting at OSI layer 4). *Id.* at 1:22-25. The protocols work by passing data on hops from one router to the next. *Rajan* is concatenating packets for forwarding between routers, but is not concatenating them based on their destination nodes being the same.

As discussed above, the Examiner agreed that claim 3 of the patent was allowable over *Rajan* based on the function of the packet aggregation module using the aggregation IDs to identify packets that have the same destination node. *See* Notice of Allowability, at 2. *See also* U.S. Appl. Ser. No. 12/117,890, Office Action (March 20, 2012) [Ex. G] at 3-8 (specifying that claim 56, reciting "[t]he system of claim 55, wherein the packet aggregation module identifies the same destination node by identifying a same aggregation identifier," is allowable if rewritten to overcome an infiniteness rejection). The use of this destination information for aggregation purposes was not well understood, routine, or conventional.

Further, the claims satisfy *Alice* step 2 because the specification explains how the claimed system improves upon a communication network, *i.e.*, the claimed system reduces the packet overhead information by, eliminating overhead information that otherwise would be required for each and every PDU sent separately (compare bottom Fig. 3 showing separate MoCA packets to the aggregate packet of Fig. 4). '910 Patent, col. 2, lines 1-3; col. 6, lines 25-27.

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CERTIFICATE OF COMPLIANCE

The undersigned, counsel of record for Plaintiff Entropic Communications, LLC, certifies that this brief contains 4,538 words, which complies with the word limit of L.R. 11-6.1.

Dated: June 26, 2023

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